1138-11 **Clinical Improvement Seen in a Single Center Experience With Cardiac Resynchronization Therapy in Patients With Congestive Heart Failure: A Report of 500 Cases**

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BACKGROUND: Several large clinical trials of cardiac resynchronization therapy (CRT) have now been completed and demonstrate clinical improvement in patients with congestive heart failure (CHF). Despite all the studies now becoming available, only a limited number of patients and patient populations have been evaluated.
METHODS: We retrospectively analyzed the first 500 patients treated with CRT at our center from July 1999 to December 2001. Implant criteria included patients with left ventricular dysfunction and ejection fraction ≤ 35%, CHF with severe functional impairment of NYHA class II- IV, and symptoms refractory to standard medical therapy. Patients included primary implants, upgrades from prior pacemakers, chronic atrial fibrillation cases, dual pacemaker/defibrillators, and those who required epicardially placed leads. Follow-up was after 6 months of active therapy.
RESULTS:

	pre-implant	active CRT	p value
EF (%)	21.8±7.2	30.0±11.3	<.01
NYHA class	3.1±0.4	2.1±0.7	<.01
Six min. walk (meters)	270±89	324±91	<.01
MLWHF score	64.7±22.8	39.5±23.8	<.01
QRS duration (ms)	180±31	153±30	<.01

CONCLUSION: A large volume at a single center demonstrates that biventricular pacemakers can be placed in a variety of patients with good overall clinical outcomes. CRT should be considered as therapy for patients with CHF who are in normal sinus rhythm, who have had a previous pacemaker, who have atrial fibrillation, and those who require epicardially placed leads with thoracoscopic guidance. CRT has now become standard therapy for patients with severe CHF and a widened QRS at Emory University.

1138-12 **Percutaneous Coronary Venous Angioplasty for Left Ventricular Lead Placement in Cardiac Resynchronization Therapy: Analysis of 35 Cases**

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Background: Cardiac resynchronization therapy (CRT) is beneficial in the treatment of heart failure associated with QRS >120 ms and ejection fraction ≤ 35%. Successful CRT is achieved by placing a lead on the lateral free wall of the left ventricle (LV). However, diaphragmatic pacing, high thresholds and difficult coronary venous structures can prevent optimal lead placement. Percutaneous coronary venous angioplasty (PCVA) may facilitate LV lead placement in these cases.
Methods: A retrospective analysis was performed on 35 of 427 patients undergoing CRT in whom PCVA was utilized to dilate a target vein for LV lead placement.
Results: Twenty nine patients had prior open heart surgery. PCVA was performed for the following: target vein stenosis (21), target vein <1mm (2), obstructive thrombus (2), tortuous vein (6), collaterals to provide an alternative location witin the target vein territory(4). In one patient both the great cardiac vein and a target vein stenosis required PCVA. Non compliant balloons ranging from 2.5-4 mm in diameter and15 to 23mm in length were inflated to a maximum of 26 atmospheres. PCVA facilitated lead placement in 24 of 35 patients. Analysis of the 11 failures by catgory revealed: *Stenotic veins*; 3/21 did not open at 18 to 22 atmospheres, 2/21 the stylete driven lead caught in the disruped vein. *Tortuous target*; 4/6 vein segments recoiled. *Small target*; 2/2 veins occluded. There were no complications associated with PCVA.
Conclusion: The overall PCVA success was 69%. Failures were more common in tortuous vein segments (67%) and small target veins (100%). Straightening tortuous vessels with an auxiliary indwelling wire may be preferable to PCVA. For the stenotic vein failures a cutting balloon may be useful in the 3 cases that does not dilate with a standard balloon while an over the wire lead may have worked where the stylete driven lead failed post PCVA. Target vein collaterals may be dilated to provide an lead location not otherwise available. PCVA safely increases the success of CRT in patients with and without prior OHS.

POSTER SESSION

1139 Implantable Cardioverter-Defibrillator Therapy: Applications and Outcomes

Monday, March 31, 2003, 3:00 p.m.-5:00 p.m.
McCormick Place, Hall A
Presentation Hour: 4:00 p.m.-5:00 p.m.

1139-1 **A Defibrillator With Constant Effectiveness Over Impedance**

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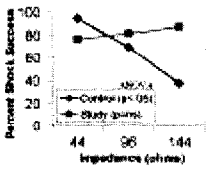
Background: Patient impedance for external defibrillation ranges from about 30 to 150Ω or more. Peak current values and shock success rates for energy-dosed external defibrillation vary with impedance. This study tested a new dosing approach designed to adjust energy to provide the same effectiveness for any impedance.**Methods:** The effect of impedance on the shock success rate of a conventional 150J, impedance-compensating, biphasic external defibrillator (CTL) was compared to a "constant effectiveness," variable energy defibrillator (STUDY). Five anesthetized pigs (28 - 35kg, 36 - 56Ω) were shocked with these two devices after 15 seconds of electrically induced ventricular fibrillation. A series resistance of 0, 50 or 100Ω of was added to create a range of impedances representative of clinical use. Shock sequence was randomized. Shock success was documented and peak current and voltage were measured for each shock. Delivered energy was calculated. Changes in efficacy versus impedance for each device were analyzed with ANOVA. **Results:** CTL delivered a fixed energy (±10%) but STUDY varied significantly (97J - 310J). CTL shock success rate decreased significantly with increasing impedance, while STUDY showed no significant change (see figure). **Conclusions:** STUDY is equally effective over a wide range of impedances. STUDY avoided delivering unnecessarily high current shocks to low impedance subjects, reducing injury risk, and increased success rates for high impedance subjects.



1139-2 **Comparison of Patients With and Without Atrial Fibrillation After Implantation of a Dual-Chamber Defibrillator Using a Defibrillation Lead With Free-Floating Atrial Bipole**

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Background: The implantation of a single-lead defibrillation lead with a free-floating atrial bipole can detect the atrial activity without the need to implant a separate atrial pacing lead. A potential limitation is the inappropriate detection of atrial fibrillation (AF). The aim of the study was to compare patients with and without spontaneous AF episodes after implantation of a defibrillation lead with a free-floating atrial bipole.
Methods: The study included 99 patients with an accepted ICD indication who received the dual-chamber ICD Delkos A+ (Biotronik) and the single-lead defibrillation lead Kainox VDD. The atrial bipole is positioned 15 or 17-cm proximally to the ventricular tip. The ICD has a 4times more sensitive atrial detection channel. Patients with and without paroxysmal AF were compared with respect to their clinical characteristics, electrical measurements, and incidence of spontaneous ventricular tachycardia and fibrillation (VT/VF).
Results: During 6 ± 5 months follow-up (1296 patient-months) 8 patients had 19 AF episodes and 91 patients remained in sinus rhythm (SR). The NYHA class was 1.7 ± 0.7 in the SR group and 2.3 ± 0.8 in the AF group ($p<0.05$). The ejction fraction was 38 ± 14% in the SR group and 25 ± 9% in the AF group ($p<0.05$). A history of myocardial infarction had 54% of the SR group compared to 100% of the AF group ($p<0.05$). The P-wave amplitude was not different at implantation (SR: 4.8 ± 1.7 mV, AF: 3.8 ± 2.0 mV) and after 6 months (SR: 4.6 ± 2.0; AF: 3.3 ± 2.0 mV). There were no differences for atrial pacing threshold, atrial pacing impedance, and for the ventricular electrical measurements. Twenty-six (29%) patients with SR had 101 VT / VF episodes and 2 (25%) patients with AF episodes had 7 VT/VF episodes. The ICD detected 18 AF episodes correctly and P-wave undersensing occurred in the remaining episode.
Conclusion: The incidence of paroxysmal AF during 6 months after ICD implantation was 8% with a new onset of AF in most patients. Patients with spontaneous AF episodes had a more advanced heart failure compared to patients with SR. As the P-wave amplitude was similar in patients with and without AF, the ICD detected 95% of the AF episodes with fast ventricular rates correctly.